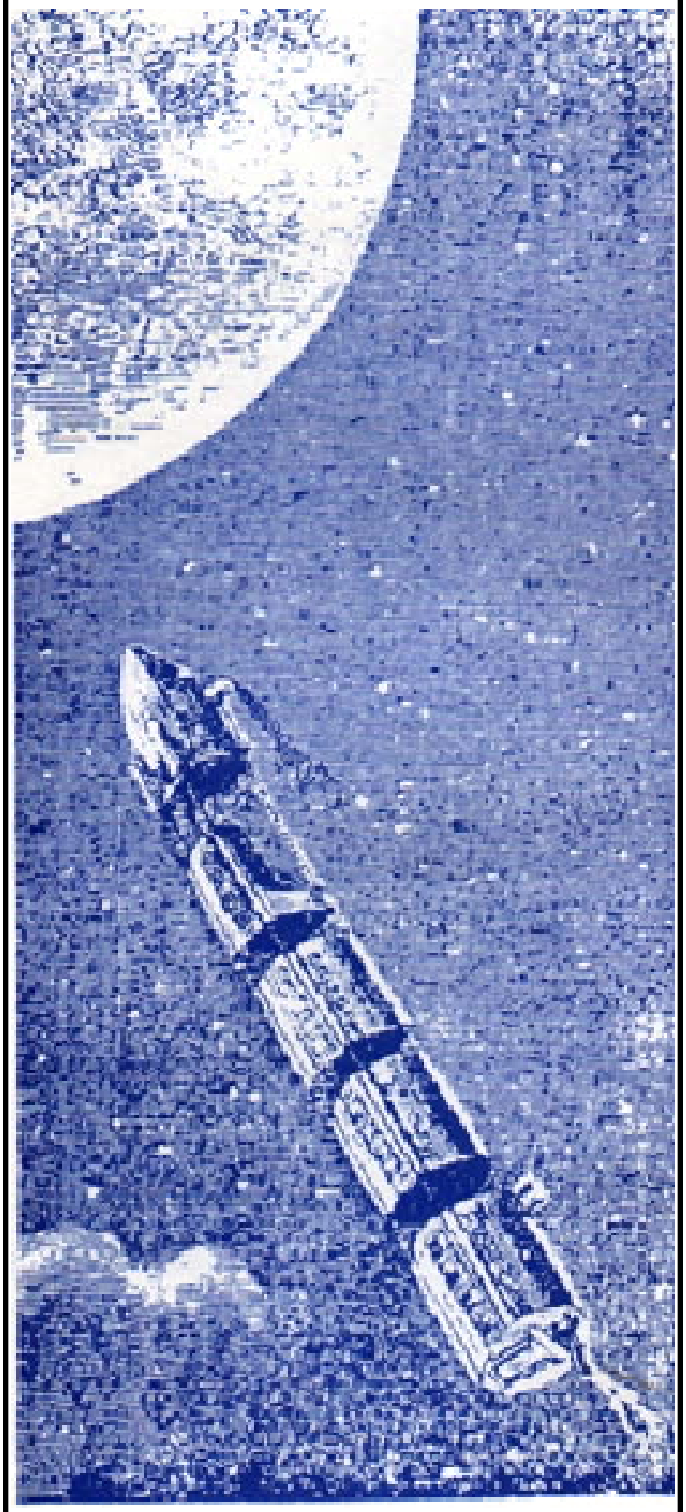
Moon Miners' REVIEW
& Moon Society Journal



#30 January 2002

In This Issue

The **Moon Miners' REVIEW** is published semi-annually each January and July by and for the members of the Moon Miners' Manifesto family of National Space Society chapters, for the members of The Moon Society, and for individual subscribers worldwide.

The **REVIEW** provides a semi-annual burnout prevention and regeneration break for the editor of **MMM** .

Moon Miners' Manifesto will return next month (February, 2002) with issue #152.

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Iowa Robotic Observatory and Torus Technologies Makes Astronomy a 'Hands-on' Experience for Students

Jamie Ambroson <jamie@mcshome.com>

When Dr. Robert Mutel began studying astronomy in 1966, technological advances in science did not allow him, and the thousands of students interested in astronomy around the world, to study 'real-time' movements in the Earth's outer atmosphere. Instead, what students like Dr. Mutel received was a 'canned education'.

Today, the astronomy lessons that University of Iowa Professor of Astronomy Dr. Robert Mutel teaches his students have come a long way. Thanks in part to Mutel's desire to see more students get interested and involved in astronomy through hands-on learning, there's a fresh approach to the way students learn and the way teachers teach. A working relationship that developed between Dr. Mutel and a small Iowa City, Iowa, based company known as Torus Technologies, was the catalyst for that change.

The Automated Telescope Facility

In 1993, Stacy Palen, an entering graduate student at the University of Iowa, stepped into a dramatically changing curriculum in the astronomy department. Over the previous several years, Dr. Robert Mutel had been researching robotic telescopes for educational use, and investigating the feasibility of installing one at the U. of Iowa. Finally in 1992, just a year before Palen enrolled at Iowa, Mutel found the funding to install the University's first robotic telescope on the Universitycampus. Called the Automated Telescope Facility (ATF), the 7” refractor telescope was situated on the roof of Van Allen Hall in Iowa City, the home of the astronomy department.

The pioneering ATF gave students and faculty at Iowa their first experience in hands-on observations. Graduate students like Palen, who got in on the cusp of this dramatic change in astronomy education, were able to help Dr. Mutel develop a curriculum, as well as the undergraduate lab manuals students used to learn about astronomy with the ATF. The project generated a lot of excitement among Palen and her fellow graduate students. But Stacy thought the changes in education it generated among undergraduate students were even more intriguing.

> “Undergraduate non-major 101 Astronomy students make up the majority of students who will come into contact with this telescope, and that's a great thing," says Palen. "Suddenly, this development of a very hands-on curriculum makes astronomy a really exciting thing, and I know it persuades people to become much more interested and excited in astronomy.”

Over the next several years, Mutel continued developing and improving software for the ATF to make it a better educational unit. But outside of the telescope itself, there were some problems. The cold Iowa winters were getting rough on students and educators who had to spend a large amount of time making observations on the roof of Van Allen Hall. Additionally, the Van Allen building was located just adjacent to downtown Iowa City, and bright street lamps in the area made accurate observations incredibly difficult. So Mutel developed a plan to build a robotic telescope system in a warmer climate. He knew that the robotic telescope and observatory could be built anywhere in the world, as long as Iowa students had adequate software and access to it via the Internet. It was in 1996 that the idea for the Iowa Robotic Observatory (IRO) was born.

With a plan in mind, Mutel contacted James Mulherin at Torus Precision Optics. Knowing their reputation for building high-quality telescopes, Mutel contracted Torus to fabricate the "glass" for the project. Torus went to work on the primary and secondary mirrors for the IRO, and had them finished by late 1997. The telescope was placed in a remote location near Sonoita, Arizona. The observatory that contained the telescope was completely robotic, and was scheduled in advance at a central control facility at the University of Iowa. Following some minor set-up difficulties and an electrical fire that set the project back nearly a year, the IRO successfully began operation in September 1998. The IRO supplied University of Iowa students and professors with more than 10,000 images a year.

In the next few years, Dr. Mutel found interest growing nationally for robotic telescopes. As he traveled the country talking about the IRO, a large number of astronomy educators expressed interest in having their own robotic telescope system. Mutel knew there had to be an easier way to set up a system like the University of Iowa had. So, in 1999, he put in a proposal to the National Science Foundation (NSF) to build what was to be a complete, turnkey robotic telescope system. This system, as he proposed it, would be reasonably priced for most colleges and universities, and would be designed for use in undergraduate astronomy education and research. With a go-ahead from the NSF, Mutel sought out Torus to again partner with him in his new endeavor.

The Rigel Project

By May of 2001, a prototype of Mutel's proposed turnkey system had been developed and put into place at a local Iowa City test site as a joint product of the U. of Iowa and Torus Technologies. Dubbed “The Rigel Project”, it was developed as a complete turnkey system consisting of a 14.5 inch f/14 Cassegrain telescope, large-format CCD camera, filter wheel, spectrometer, dome, and weather station. The web-based, user-friendly observatory control software that operated the telescope quickly proved to change the way undergraduate students at

the U. of Iowa were learning about astronomy.

> "Before robotic telescopes such as Rigel were put into place," says Dr. Mutel, "the 400 to 500 survey-level students we had were learning astronomy from a canned set of images. Since we didn't have the time or resources to teach every student in a night class, they were basically just doing workbook exercises. These telescopes have fundamentally changed that because they allow students to choose their own object of study, make their own observations, and analyze their own images. That's what science is all about."

Currently, Torus Technologies is developing a new line of turnkey observatory systems based on the development of the Rigel Project. The new product line is named Nighthawk with observatory systems incorporating telescopes ranging in size from 14.5-inches to 24-inches in diameter. The new prototype allows students to operate the observatory in either 'real-time' or queue-based scheduling. As well, Mutel and his colleagues currently are developing a companion curriculum that will allow instructors to integrate Rigel observations into astronomical laboratories. Although the primary focus of this curriculum will be undergraduate laboratories, parts of the curriculum will also be suitable for high school courses, as well as more advanced undergraduate research projects.

With the success of the Rigel project at Iowa, Mutel and Torus Technologies expect a strong demand for turnkey systems, like Nighthawk, among science and astronomy educators across the nation in the coming years, though Mutel says there are some problems to overcome. "It's a very challenging and complicated piece of equipment," says Mutel. "It's not just software, it's not just a telescope, it's a tightly-coupled combination of both." Along with Torus, Mutel and his colleagues have been testing the Rigel prototype for the past several months. Torus expects to begin delivery of the first production Nighthawk systems in the Spring of 2002.

A Huge Difference

"Having seen what happened at Iowa with this system in place, and now having been at a school without it. I can tell you, there's a huge difference," says Stacy Palen. Eight years after her first exposure to robotic telescopes, Palen has her Ph.D. in astronomy from U. of Iowa, and is currently an instructor in astronomy at the U. of Washington. She says she feels the turnkey systems have a huge potential to make a difference in the way students learn about astronomy, especially at those educational facilities that don't have access to telescopic equipment of their own. "Students will learn a great deal more about how science gets done," says Palen. "This is a genuine hands-on implementation of astronomy."

As an instructor to undergraduate students at the U of W, Palen has a plan in mind to implement Torus' turnkey system once it goes on the market. Her focus will be on using it to teach non-majors. "The developments that Torus Technologies and Dr. Mutel have made together will fundamentally change the way my students, and all students, learn," she says. "There's no doubt about it."

John Armstrong, a current astronomy Ph.D. student at the University of Washington, has dedicated a good chunk of his time to helping Torus develop tools to be used for astronomy education. Armstrong worked with Dr. Robert Mutel at the University of Iowa as an undergraduate student. He says years of experience as a student, and as a teacher, have given him some terrific insight into what works best for teaching. So the educational aspects of Torus' developments are really his focus.

"At some point, the students who use the Torus telescopes have to learn something," says Armstrong. That's where he comes in. Currently, Armstrong, along with software designer Steve Ohmert, is developing a curriculum for the telescope that not only teaches students step-by-step how to use the telescope via the Internet, but also contains educational activities that will help them learn with the telescope. "We don't want our introductory astronomy students to have to learn about all the technical aspects of the telescope. We want them to focus on their astronomy education. At the same time, we need to make sure astronomy majors are being educated on both. so that's where our challenge comes in," says Armstrong.

What they've developed is a science-grade instrument that both scientists and non-scientists can use. This complete software will be packaged with the telescope. "Our focus is on the software. that's what makes the Torus project different. The software allows students and teachers so many more opportunities to learn, because they're not getting a boxed education."

One of Torus' most recent customers, Dr. James LoPresto, professor of Astronomy at Edinboro University in Edinboro, Pennsylvania recently installed a TORUS CC05, in July 2001. A professional astronomer, LoPresto made the decision the school needed its own observatory, so he found some land to purchase in a dark location near the University, and set to work on building what he now calls the Maize Sunfire Observatory, housing the telescope in a dome.

(www.edinboro.edu/cwis/physics/observ/home.html)

(www.toolcity.net/~goblue/)

LoPresto's reason for purchasing Torus' telescope? Simply put, education. Just two months after installation, LoPresto already has great plans for how the telescope will be put to use. Right now he's proposing two possible research projects for his students, and some original educational plans he

calls 'outreach programs'.

LoPresto says the University now has a new building housing several high-tech classrooms. One of those classrooms will be dedicated to the Maize Sunfire Observatory. There, students will be able to operate, via computer, the telescope, which sits about four miles away from the University. Students will be able to adjust and rotate the telescope themselves. LoPresto also has future plans to put a TV camera in the telescope's dome so students will actually be able to see how they are physically controlling the telescope from the computer. "This telescope is much more sophisticated than any I've worked with in the past," LoPresto says. "It will make an excellent educational tool."

LoPresto says the University is not confining itself to educating just its own students with the new tool. He has already contacted three or four other nearby universities that would like to utilize the telescope. In addition, LoPresto is in the process of sending out information to all science teachers in all grades in the surrounding three counties. His plan is to make individual arrangements to work with them, whether they're 8 or 18, to give them a more hands-on approach to learning about astronomy.

LoPresto is also excited about the future possibilities of building a network across the country and around the world with Torus telescopes. Rich Williams, VP of Marketing and Product Development for Torus Technologies, is currently constructing an observatory to house a TORUS CC06, Torus' 24-inch diameter robotic telescope. LoPresto and Williams plan to work together with their telescopes to focus on supernova hunting and asteroid hunting. They plan to bring others into the study as well to create a large network.

So, why Torus? Because their telescopes are incredibly sophisticated, LoPresto says. “It gets students familiar with a more professional telescope. It's not just a backyard telescope. You can teach them some very basic concepts about astronomy using state of the art technology. The combination of software, affordable engineering, and the ability for the telescope to track images for an extended period of time gives students access to a real sophisticated robot.”

Thanks to Forward Thinking

Why is Torus the first to take the bold step to create a complete, robotic turnkey telescope? Dr. Robert Mutel attributes it to the forward-thinking of the employees of Torus. "Other companies have people who are good at one thing or another. They think in a more traditional sense," he says. "Most of the telescope companies out there didn't see the Internet as becoming as important of an educational tool as it has become," says Mutel. "Torus has combined the best of both worlds." **<JA>**

[James Ambroson lives in Cedar Rapids, Iowa]

RED MARS 2002 Final Frontiers Conf.

Earth to Mars think tank woodland encampment

July 12-14, 2002 CE three days - two nights
Lothlorien Nature Sanctuary - Needmore, IN

Theme: Mars Migration from Spaceship Earth
“new interfaces and connections”

Community Think Tanking: Terrestrial Regeneration & Mars Terraforming Processes Bootstrapping “means & methods” - from Earth to Mars creating Cooperative Enterprise to accomplish the above.

Special Exploration: Earth-Space EcoTechnics: mating machinery to nature 100% waste recycling food producing greenhouses advanced power and propulsion systems practical space age habitat designs harsh environment settlements.

- mornings: THINK TANK SESSIONS 9 AM -12 noon
- afternoons: SEMI-FORMAL PRESENTATIONS 1-6pm
- evenings: CAMPFIRE DISCUSSION CIRCLES, STAR PARTIES,other RELAXING ACTIVITIES

Tours and use of the Lothlorien* facilities

a. Radiance Hall Educational Center & Greenhouse
b. Biostar-A: eco-tech testbed and family home
c. TOM - Test One Module: closed ecosystem testbed
d. campground, gardens, hiking trails, and more
e. solar/wood showers and evening sauna
f. solar electric and wind power systems
h. the Nature Sanctuary itself

*info on Lothlorien -- http://www.elflore.org

Accommodations

While this is a BYO gear, tent, tipi, yurt, port-a-dome, van, or small camper style event, there are three motels within a 10 mile driving range for those who prefer comforts. Information upon request. Home-cooked breakfast and dinner (vegetarian & omnivore) is available on site for a fair price. Firewood is provided. Bring a container for drinking water (fill at pump). Basic recycling and composting privies are provided. Take non-recyclables back home with you. Help keep Lothlorien beautiful!

Registration

Bring the whole family! Daytime Earth-Space oriented children’s activities and nightime stargazing (weather permiting) will be on the schedule. Feel free to take a long hike. Explore the varied terrain of Faerie Valley and be amazed at the biological diversity. This is a no-hunting haven for flora and fauna. Firearms are not permitted on Lothlorien.

PRE-REGISTRATION - DISCOUNT RATES

(valid only if post-marked on/before June 21, 2002) children (0-12) free of charge ---- teens (13-19) $25 adults (20-64) $35 --- mature (65-up) free of charge At-the-Gate Registration Fees (after June 21st, 2002) add $15 per person to the rates stated above.

Check or money order made payable to: LOTHLORIEN, P.O. Box 1082, Bloomington, Indiana, 47402-1082

Red Mars 2002 Conference & The Green CELSS Evolution

by Terry Ryan Kok

The human desire to travel beyond the confines of Earth's biosphere is an entirely natural and evolutionary trait. It is a persistent itch which we are compelled to scratch. Human society, without a frontier, an edge to explore, becomes complacent, rigid, boring, and stuffy, like an small closet with a tight door. A culture which refuses to change and grow with the times and environment, ossifies and eventually dies in the brittleness of old age.

Space is the final frontier. Opening up access to space is like unlocking the closet door, swinging it wide, allowing the smell of musty clothes to float away. Other authors have more than adequately explained the details of why and how we might begin the migration process. Most published plans assume that big government will take the lead. Those of us close to the space industry realize that the opposite is true. Big project funding is being cut year by year. The emphasis is currently shifting towards corporate commercialization and private enterprise. NASA is broke. If we are going to explore the final frontier, fixing our planet in the process, we are simply going to have to get past our ego trips and pool personal resources. We need a practical and fair way to do so.

> "We will transform the Earth from the garbage pit of civilization into its rightful place as the bread basket of the solar system, plant propagator, green machine, exporter of fine food to the Moon, Mars, and world's beyond." - the Alchemist

In the long run, it may prove to be easier to restore the balance of nature on Earth if humanity would first make a firm commitment to the colonization and terraforming of Mars. The ecotechnics necessary to transform a frozen desert world into a garden oasis will provide terrestrial planet doctors with medicine machines capable of affecting a swift cure for environmental degradation. We must create a breathable atmosphere and open water on Mars. On Earth, all we have to do is clean up the mess.

There will always be narrow sighted people who insist that humanity has no right to extend our reach beyond the Earth's life supporting envelope, especially if we do not first fix the damage we have done to our home world. They argue that space migration is a waste of limited funds, that explorations on the final frontier should take a back seat to solving current problems on Earth. As an accomplished ecotechnician and planet doctor, I would like to affirm that we cannot do one without the other.

> "Why wait for Mars when we could live a Space Age lifestyle today? If we do not get it together on Earth we will find it even more difficult to get it together on Mars." - Tindome Orendil Dor Elda

If we wait for popular support, we will wait until Spaceship Earth is a burnt out hulk, smoldering in the ashes of self-inflicted ignorance and environmental degradation.

We are talking about none less than the successful evolution of the human species and of the biosphere as a whole. To be sure, it is in our collective nature to change the planetary environment. A huge number of people, especially when they are armed with high power machinery, can alter the territory fast. What sort of world do we want to make Earth into? What should we do with the Moon or Mars? Needless to say, it is extremely important to make some good choices here. The natural life supporting ecosystems are being destroyed right and left by "mass produced open system machines and their profit/pleasure seeking operators". Yet, I am not against technology. We should become more sophisticated, more space age in our approach to the configuration and use of technology. Technology can be used to either kill or cure. Let us choose the cure. RED MARS 2002 is focused on the cure. I hope you will become involved.

Conference Plug

If you would like copies of the official RED MARS 2002 promotions flyer, please email me with your snail mail address and we'll ship you a bundle. NETWORK NOW!

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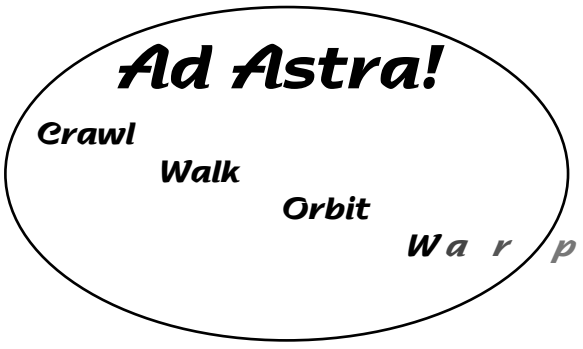
Where is Needmore, Indiana?

about 40 miles SSW of Indianapolis
about 10 miles ENE of Bloomington
about 240 miles SSE of Chicago
about 80 miles NNW of Louisville
about 100 miles W of Cincinnati



"There is no greater risk than not taking a risk"

Moon-ISRU (In Situ Resource Utilization)

Towards the Ultimate Self Sustainable Society

Modelling In-Situ Resource Utilisation for a Lunar Colony

A Research Project by Dr. Niklas Järvsträt
http://www.algonet.se/~literat/
http://www.ims.org/index_projects.html

The objective of the proposed project is to perform a complete structured breakdown of the manufacturing requirements posed by a small modern community (using a lunar colony as a clean-sheet study object). The project will contribute to the growing success of supply chain management (SCM) practices, by creating a framework for measuring and controlling the total material usage. In contrast with the current SCM focus on the delivery of single products, the lunar colony approach will force a shorter supply chain with fewer tiers of suppliers but requiring much more thorough integration as each product have a resource impact on everything else.

The main theme of the proposed project is:

- **Total product life cycle issues** with a focus on minimum use of energy and materials in a total sense, which encourages recyclability and refurbishment.

Other themes are also addressed:

- **Process issues** such as reconfigurable and flexible production systems and clean manufacturing processes
- **Virtual / extended enterprise issues** by establishing material interfaces for concurrent engineering across the international team involved in the project
- **Human/organisation / social issues** by publishing project results on space age manufacturing thus improving the image of manufacturing
- **Strategy / planning / design tools** by developing within the project simulation tools to support the analysis and development of manufacturing strategies from a total life materials and energy usage standpoint

Keywords: In-Situ-Resource-Utilisation, Space colonisation, Resource economy, manufacturing system

Objective and industrial relevance: The objective of the proposed project is to perform a complete structured breakdown of the manufacturing requirements posed by a small modern community (using a lunar colony as a clean-sheet study object). The project will contribute to the growing success of supply chain management (SCM) practices, by creating a framework for measuring and controlling the total material usage. In contrast with the current SCM focus on the delivery of single products, the lunar colony approach will force a shorter supply chain with fewer tiers of suppliers but requiring much more thorough integration because each product have a resource impact on everything else.

The aim of the project has two time frames in terms of industrial relevance:

1. The better control over material flows into, within, and out of the production chain in the proposed approach will not only give new possibilities to decrease the environmental impact of production and products, but also help reduce costs through an overall more effective resource usage. This can be done at project completion, giving the time frame of three to five years.
2. The project outcome will be instrumental in planning the first off-Earth human settlements, in perhaps 20 or 30 years time.

The main project results are the material flow simulation software to be developed, and a new framework for controlling the total material flow throughout supply chain and product usage.

Approach and overview of planned work: The approach adopted will be a structured step-wise requirement breakdown: In the first step, survival requirements will be identified and quantified. Then, the production facilities needed to satisfy the survival requirements would be identified and defined. Unavoidably, this will lead to further material requirements, as equipment is needed for the production. Versatile and flexible production system solutions will be required to avoid overly long chains of manufacturing equipment to manufacture manufacturing equipment, etc.

Research activities: The project will be realised trough completion of three types of workpackages:

1. In workpackage 1, living conditions, the focus will be on defining and quantifying demands on commodities that must be manufactured.
2. In the workpackages 2-7, the focus will be on defining in more detail the best manufacturing approach to produce the commodities needed. (WP2: Food production and life support, WP3: Mining and processing, WP4: Power and transport, WP5: Simple manufacture, WP6: Complex manufacture, WP7: Construction.) Trade-off studies will be performed between different manufacturing solutions, and secondary manufacturing requirements will be defined and quantified. Prototype manufacturing activities will be employed to prove the feasibility of new concepts.
3. Finally, workpackage 8, material flow software and simulation, will be concerned with establishing and communicating a user-friendly system for keeping track of the flow of material and energy through manufacturing and life support processes.

Cost / Duration: 30 person-years over 3 years

Milestones: Main milestones (month in parentheses): Preliminary requirements quantification (9). Prototype material flow software (9). Preliminary system definition (18). Conceptual design of self-supporting production system in lunar colony and terrestrial production system (30). Material flow software demonstrated and used for simulating production system design (36).

Value-added of the international co-operation: Supply chain management is by its extensive nature involving a large number of international companies for all but the simplest supply chains. The global market of today makes it essential to effectively manage the whole supply chain, including first, second and third tier manufacturers from all over the world. Thus, it is not only natural to include companies from several continents. In many cases it would be difficult or even impossible to find companies specialising in each of all manufacture steps in a single region. For the present application, design and manufacturing expertise from Europe will be blended with space exploration knowledge from the USA, Canadian telemining competence and the construction experience from the Japanese building giant Shimizu. Supply chain management practises and software development will be pursued by European companies, and the US company CyberTeams will provide internet enabling software and support to handle the information exchange needs this tightly collaborating multi-continental project.

The first human landing on the Moon in 1969 was a giant enterprise, involving more than 400,000 people in 20,000 US industries. Today, no country will be able to colonise the Moon by a solitary effort. However, although the interest in lunar colonisation is rapidly increasing, there are no realistic detailed plans for long term utilisation of lunar resources. Even though much of the technology used in 1969 is now more or less routine, establishment of a lunar base will require considerable technical development, and will naturally force co-operation of organisations that would not otherwise have any contact.

Collaboration with relevant European and international projects will be actively sought, to obtain input on validation procedures for assumptions not treated in the proposed project. Later, also to provide input to other projects concerned with lunar exploration and exploitation. The project is part of an international effort initiated by Dr. Jårvsträt (Literati, Sweden) with the ORBITEC led NIAC phase I project System Architecture Development For A Self-Sustaining Lunar Colony, continuing through the IMS endorsement process, and currently attracting an increasing number of organisations worldwide. Collaboration with other *Moon projects* will be initiated through the contractors many contacts with national and international space agencies and interest organisations. **<NJ>** <literat@algonet.se>

"De Plane! De Plane!"

11/15/01 *Is it just me, or have others also noticed those rascals at DARPA are funding an X-Prize entrant virtually indistinguishable from Boeing's notional x-prize concept some years back? Speaks volumes about our "Fantasy Island" Space Movement and the inadequacy of Pure Lemonade Stand Capitalism (PLEM) here when that vaunted "New Spirit of St. Louis" has to be bailed out by the Tetragon.*

Jeff Sanburg
Skokie, Illinois

[Not all mail is friendly mail. Below is a recent example with a virulently hostile tone.]

On visiting www.lunar-reclamation.org

11/30/01 *Good God! I thought geekland had died out! And yet, good heavens, here is a website polluting cyberspace that portrays its idiocy as logical!*

Only in America!!!! Tra-la-la. Good God, no wonder we have terrorists! How else can we shut assholes-on-line like you down, hey squittl?

Kokhy-wohky, it won't happen, you do not know enough about space, environments, evolution and life to have even an inkling about what you are trying to state.

Please re-read your website and get rid of the foolishness and embarrassments. Where you surmise, you are wrong; where you quote, you're off the planet.

By the way, which loony-bin (sorry for the pun) did you belch from?

The Tarot cards tell me you will be dead sooooon!!!!!! Ooooooooohhh.

Steve O'Connor
<goingtomars@bigpond.com>
the society against witchcraft, religion and doohickeys.

The Burden of *Failure*
is light in comparison to
The Burden of *Regret*
at not having tried.

http://www.moonsociety.org

Please make NEWS submissions to
David Wetnight at newsmonger@asi.org
Other submissions: KokhMMM@aol.com

The Moon Society was formed in July, 2000 as a broad-based membership organization with local chapters, to spearhead a drive for the further exploration and utilization of the Moon in cooperation with other like-focused organizations and groups.

Artemis Society International was formed in August 1994 as a forum for supporters and participants in the **Artemis Project** ™ quest to establish a commercial Moonbase as a first step to a permanent, self-supporting lunar community. **ASI** does not engage in any form of commercial business directly, but seeks to build a Project support business team. Registered trademarks of the Artemis Project™ belong to The Lunar Resources Company®

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How to fix MMM Subscription Errors:
www.asi.org/adb/06/09/04/1999/09/news-19990915.html

MOON SOCIETY 2001 Election Ballot

Ballots were mailed out in December for several offices in the Moon Society leadership:

- Vice-President (1 candidate: David Wetnight)
- Secretary (2 candidates: Amy McGovern, Simon Rowland)
- 2 Board Member slots (10 candidates: Dana Carson, Steve Jackson, James McEnanly, Michael Mealling, Andrew Newstead, Vik Olliver, Richard Perry, David Schrunk, Ian Strock, Madhu Thangavelu) [an outstanding crop - a pity at least half of them could not be elected! - PK]

To determine the winners for the two Board Member slots, voters are to express preference 1-10. Not ranking a particular candidate will be interpreted as indication of no preference. Votes will be weighted accordingly.

Other positions (e.g. President, Treasurer, other Board slots) will be up for election next year i.e. on a staggered basis. All terms of office are for two years.

Ballots were to be returned by January 15th.

If you did not receive a ballot, it may be because your membership has lapsed. Or you have may have moved and not notified the society of your new address (in which case you will probably not receive this newsletter!)

We need you, so do check your status, and if your membership has lapsed, please soon!

Ian Randal Strock Interviewed for Reuters Television

From: Ian Strock <irs@panix.com> Nov. 30, '01

Wednesday [November 28th], I was interviewed by a producer for Reuters Television. The location was outside the new Rose Planetarium in New York City -- nice backdrop! -- just after interviewing Dr. Tyson, the director of the planetarium. He was also scheduled to interview Denise Norris of Applied Space Resources [Lunar Retriever Mission] today.

The genesis of the story was an article on lunar mining we have been talking about. My interview went into a bit more depth about the Artemis Project.

The story was scheduled to go out on Friday evening's feed [November 30th]. It could appear on CNN, NBC, BBC, and German television, and on local stations that carry Reuters stories. As with print wire services, what stations air is up to them - [depending on whether they need 'fill' or not]. I'm heading out of town for the weekend, so I hope someone will see it and tape it for me.

Ian, Editor of ***Artemis*** Magazine

Moon, Mars, and Making Money

http://www.spacer.com/news/oped-01f.html

There are two identifiable camps in the generation now entering political power - those who are looking for a return to the Moon on a commercial basis, and those seeking a government-sponsored human exploration of Mars.

- Reprinted with the atuthor's express permission

- Recent articles on *SpaceDaily* [spacer.com] such as "Where's my flying car?" and "The Lure of Mars" reveal a common trait between two identifiable camps of the 'Children of Apollo'. They want something.

Unlike the 1960's generation who at the removal of various social barriers went out and created, the 'Children of Apollo' generation (born in the late 1950's and 1960's) have been used to getting what they say they want.

Brought up on a high energy diet of post-Apollo NASA PR, better SF films, television and literature, their constant wanting had been fulfilled.

Until now. With the turn of the century, that Apollo generation finds itself in a mid-life crisis. They are looking around for the toys that they had been promised, and are asking where they are.

he two identifiable camps in this generation are those looking for a return to the Moon on a commercial basis, and those seeking a government-sponsored human exploration of Mars.

A common driver in these communities is a small number of folk who have realised that if they want these things, then they have to go out and create them. The reason for the non-existence of the moon bases and flying cars, and all the other complaints of this generation is largely due to that generation being a little late in taking on the responsibility to make those things happen.

Back To The Moon

At considerable expense, and as a spin-off from political aims, NASA proved with the Apollo programme that you can get to the Moon.

Work done by The Moon Society in recent years has identified the probable cost of a commercial manned return mission as being well under $2billion. This is supported by reasonably detailed programme and project breakdown structures for products and costs and which have been prepared by experts with substanital experience in this area.

Being a commercial objective however, a major failing in our current understanding of commercial lunar exploration is quite simply how to make it pay. We know the costs, but cannot yet identify the revenue streams.

As a result, the manned return to the Moon is likely to be preceded by a commercial unmanned return. There is already a small gaggle of private companies working on commercial business plans and spacecraft to do just that.

But even with sound business plans and the technical expertise to perform these missions, there remains an level of investor shyness about undertaking the investment risk.

Onward To Mars

Work done by The Mars Society to date, largely off the back of Zubrin's 'The Case For Mars' book has revitalised the concept of human exploration of Mars as a target. Although hardly ever stated to date, these calls are for government money to be spent exploring other planets.

NASA itself has for years claimed no further interest in the Moon, without declaring any interest in places other than LEO (Low Earth Orbit). The reason is simple - government agencies like NASA are, by definition, driven by political agendas. NASA does what it is told to do, and in short, has suffered from a lack of firm direction from the voters.

The main fallout for the Mars supporters is that the government investment stream is currently tied up in the wrong programme - namely the International Space Station.

They have a significantly better case to present (in cost terms) in terms of the exploration of Mars, and their task is therefore simple - release the investment capital by political pursuasion. That means getting involved in steering what NASA is directed to do, using your rights, taking an interest. Not sitting back expecting it to all be done for you.

Requirements of Reality

So these two camps of opinion within the Children of Apollo generation have clearly defined roadblocks to surmount.

To return to the Moon commercially, the business processes required to make an attractive return on investment need to be defined. At present, only half the work appears to have been achieved in respect of this, although the unmanned commercial sector is looking reasonably healthy so long as it can get investment in the next year or two.

For a mission to Mars, the money needs to be redirected. It exists aplenty, but is directed at another effort. In the US, this means being able to detach spending commitments from the ISS as soon as possible. There are already some signs of NASA interest in privatising the operation of the station upon completion, but semi-privatisation to build on the clear market for space tourism could help speed that process, while removing uncertainty and fear about the commercial risk.

At the moment, all we know for sure is that NASA does not want to go back to the Moon. Equally, it is not screaming out for funding to go to Mars. It just sits there trying to defend the investment in the ISS - a sad state of affairs.

Those in favour of a manned mission to Mars can help speed that objective in several ways. Firstly, by getting in a position to influence NASA policy. Since NASA is a politically-driven organisation, this is entirely possible within a timescale of choice.

Secondly, to speed the re-direction of government investment away from LEO and towards Mars, they need to help NASA unwind from the ISS investment commitments.

The quickest way to do this may well be to push for semi-privatisation - with tourist habitation modules and the allocation of more tourism flights. As such, the Mars supporters need to be both politically and commercially aware to cajole the voting public and the rest of the political apparatus in this direction.

Where First?

The argument about whether to return to the Moon or go to Mars is a mirage.

NASA does not want to go back to the Moon and commercial moonbase plans would be destroyed by such action. The commercial space companies could not possibly contemplate going to Mars when they cannot yet see a closing of the business process loop for lunar commercialisation.

That said, there is potentially considerable crossover between lunar and Mars missions, and between government and private enterprise. Going to Mars and unwinding from nationalized budgetary interest in the ISS could be a stimulant to space tourism and hence lunar settlement.

The Government's Role

Going back to basics, the role of the government is ensure the best return on taxpayers money in what they invest it in. Any complaints about this need to go through existing political process.

In the context of the space frontier, the government also has a role to play. The ISS is clearly an overspend item with little return according to the original plan. Herein lies an opportunity to promote space tourism, and allow for the expansion of that using the ISS as a natural LEO base.

In turn, a viable tourist destination can help private investment in man rated launchers, and hence ease NASA requirements to produce a successor to the Space Shuttle.

Given a clear remit without unfair government sponsored competition, the private sector can deliver better and much lower cost of ownership launch facilities if allowed to.

All of this LEO activity helps space commercialisation through getting the human experience of spaceflight closer to the aspirations of taxpayers. In turn, they will support commercialisation efforts in LEO and those directed at the Moon.

Freed from these more local commitments, NASA can undertake the manned exploration of bodies beyond the Earth Moon system while taking advantage of increasing LEO and Lunar commercial facilities as excellent-value training facilities.

The tax payer will in fact come to expect this, and there is no better organization best placed to explore (as yet) non-commercially viable frontiers than NASA.

Summary

There is no Moon-first/Mars-first debate, since the underlying propositions are poles apart. No-one is asking NASA to go to the Moon, and in fact the success of the commercial space sector requires that Governments play a hands off role.

Both planetary camps have considerable work to do to achieve their aims. The lunar commercialization people have yet to present a completely closed economic model for a lunar base. In addition, whilst a viable unmanned commercial lunar exploration market is ready to give birth, the investment monies are still intangible at this time. The campaigners for Mars exploration need to recognise that their roadblocks are entirely political.

However, by learning some commercial tricks, they may be able to speed the road towards their goals and win over some considerable political and taxpayer support in the bargain.

[Richard Perry <rperry@dial.pipex.com> is a member of the National Space Society and of The Moon Society, a director of the commercial spaceflight company Transorbital Inc, and a member of the 'Child of Apollo' generation.]

Other Recent Essays that have appeared in SpaiceDaily's OPINION SPACE series:

The Children of Apollo & Visions for the Future
http://www.spacer.com/news/oped-01**c**.html

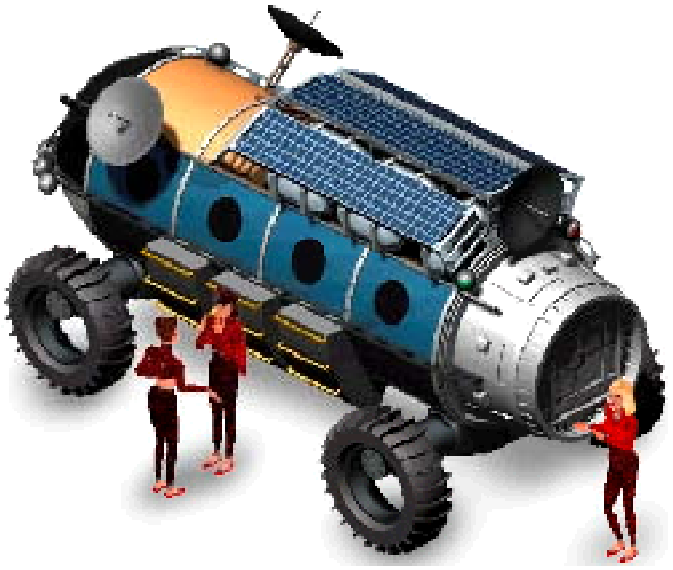
If Someone Builds It, We Will Go!
http://www.spacer.com/news/oped-01**d**.html

The Lure of Mars
http://www.spacer.com/news/oped-01**e**.html

To the Moon & Beyond With Unity
http://www.spacer.com/news/oped-01**g**.html

Moon Sims Moon Rover

Fri, 7 Dec 2001 From: Gregory Bennett <grb@asi.org>



We finally have our first object for The Sims on line at Moon Sims. It's a moon rover designed by Boris Rubanovich and implemented in the game by Dincer Hepguler. For a good time, go here:

http://moonsims.asi.org/objects/

That page also has another vignette the unfolding saga of life in Luna City. I'm hoping this presentation will serve as bait to lure folks into our educational outreach programs, and also that it will create enough interest that people will click on the "join the Moon Society" link.

I whole-heartedly encourage everyone to participate in the development of the Moon Sims web site. This is a fun activity that nearly everybody can participate in, and if we do it right, it will serve as a key outreach project for Artemis Society International and the Moon Society.

Enjoy!

Greg

For the Latest Space News its www.moonsociety.org

Many of us visit Space.com, Spacer.com, Cosmiverse.com and other space news sites on a daily basis. But there is ONE site that has links to

- ALL THE SPACE NEWS STORIES
- WHATEVER THE SOURCE
- UPDATED EVERY HALF HOUR

Your one stop shopping for space news is the Moon Society Home Page

http://www.moonsociety.org

Moon Society Chapter Websites

San Diego Moon Society (founded October 2001)
http://www.moonsociety.org/chapters/sandiego/

Bay Area Moon Society (San Francisco - Oakland)
http://www.moonsociety.org/chapters/bams/

Moon Society of Las Vegas (13 members!)
http://www.moonsociety.org/chapters/lasvegas/

Oregon Artemis Society
http://chapters.asi.org/oregon/

Artemis Society of Dallas
http://members.tripod.com/~TKMartin/artemis/

Seattle Moon Society
http://chapters.asi.org/seattle/

Artemis Society of Milwaukee
http://chapters.asi.org/milwaukee/

For Moon Society chapters without websites and for local contacts in other areas, go to:

http://www.moonsociety.org/chapters/

Moon Society Moon Flag Contest Deadlines Loom

http://www.moonsociety.org/flag/

Deadline for entries: Friday, 15 March 2002

Judging closes: Tuesday, 7 May 2002

Awards presentation date: November 2002

Eligibility for prizes: Anyone, anywhere in the world, is welcome and encouraged to participate; however only children who are between the ages of 6 and 18 on the date the entry is submitted will be considered for prizes. Immediate family members of the officers and boards of directors of the Moon Society and Artemis Society International, and of the Contest Judges, and of anyone else who will be in a position to influence the selection of contest winners, are not eligible to win prizes in this contest.

Resources:

All About Flags: (Links to resources about flags elsewhere on the World Wide Web)

www.moonsociety.org/flag/all-about-flags.html

Teachers' Resources: (The Moon Flag Contest Learning Guide and worksheets, in Adobe Acrobat format so that you can print them out and use them in your learning)

www.moonsociety.org/flag/teachers-resources.html

Meandering Through The Universe

A Column on the Cooperative Movement on the Space Frontier © 2001 by Richard Richardson

Resources for the Space Enthusiast Community

Physical Resources

The space enthusiast community has always faced severe limitations of resources and probably always will. In order to analyze the problem it is possible (and not entirely unreasonable) to divide resources into three main categories: physical, intellectual, and financial.

For the sake of this analysis I am using the term "physical" resources to refer to the laws and characteristics of nature which are immutable. Although they are usually seen not as resources to take beneficial advantage of but rather as hurdles to overcome. But I find that to be a short sighted and negative attitude to take. If we consider them to be resources and use them to our advantage we will end up much further ahead.

By "intellectual" resources I mean attitude, outlook, and disposition as much as knowledge and skill. What I'm talking about when I say "financial" is cold hard cash and every other repository of value.

So, with regards to what I am calling "physical" resources, the more knowledgeable that humans become of the scope and details of the physical properties of our universe and of the matter and energy of which it is composed, the more likely it is that humans will find easier and less expensive means by which to do those things they desire to do. However, the desire to do things generally tends to conform to current beliefs as to what is possible.

Fortunately, this is not absolutely so, or the human species would never have developed anything beyond the most primitive and obvious technologies. Also, there is sort of a positive feedback loop wherein, as more and more technological achievement advances, more and more people come to believe that more and more is possible, leading more people to do more work to advance technology, resulting in more technological advancements, leading to more and more people believing that more and more is possible, and so forth.

Not all that long ago (historically speaking) it was not possible to conceive of going into space, much less making a home for humanity there. Indeed, few could conceive of the concept of (outer) space before the time of Galileo. In most people's beliefs there was Earth, there was air, and there were solid, semi-spirit realm, crystalline spheres surrounding it all. Beyond the crystalline spheres was a purely spiritual realm of true and perfect nonexistence. There was no "space" as we think of it today. Though people wondered at the celestial lights, they never thought in terms of exploring space or living in space. The point is that even though the fundamental characteristics of nature are not changed by what humans believe, what humans believe drastically affects their ability to discover and utilize the resources available to them. The fundamental characteristics of nature are among those resources.

Intellectual Resources

This is one of the key components of what I'm calling the "intellectual" category of resources. Limitations of attitude and imagination create artificial, yet very effective, handicaps on humanity in general, and upon the space development community for the fulfillment of its aspirations. If we are not to fall victim to such limiting sociological and psychological factors we must frequently stop and search ourselves to see whether we are clinging to beliefs which artificially limit our capacity to progress to our goals. And if so, what beliefs fall into that category and what it is that we should be believing and how we should proceed in order to discover or develop the best possible replacement belief.

It is also important to remember that before the foundations of modern astronomy were laid some people had very intricate and complex notions about what lay above the sky while other considered the celestial realms unknown and unknowable. Both attitudes were equally wrong and equally handicapping. Both Luddite attitudes and believing in fantasies are equally counterproductive.

Our current technology is in a very primitive state compared to what could be expected in the future, yet there is some reason to believe that it may be just adequate to permit viable first generation space settlements. Yes, the costs would be high and the safety margins low, leaving almost no resilience in the system and the logistics would be almost nightmarish. In other words, similar to situations that humans have faced here on Earth before, when any particular culture first expanded into areas previously remote to its experience. Sometimes the settlements survived and sometimes they didn't. Like those earthly settlers, our attitudes, assumptions, fears, and beliefs often have more to do with our success or failure than the actual conditions we face.

The Viking settlements in Greenland come to mind. I consider this a particularly good example because we have archeology and written accounts of their efforts to make a home in Greenland and can come to fairly dependable conclusions about what actions they took to try to hold on there, why they did what they did, why they did not do other things that they could have done, and what led to their eventual failure.

Even more enlightening, as a comparison there where other people who had settled Greenland before the arrival of the Vikings, who coexisted with them there and who remain even today, having never

been forced to leave in all the history we know of ... which includes the very period of time that the Viking settlements failed. What quickly becomes obvious is that the Vikings tried to make Greenland fit their beliefs. At some point the natural environment changed enough that their lifestyles, grounded in their cultural assumptions, were inadequate to deal with the physical reality in which they lived and they could no longer survive there. Rather than admit the existence of the relative bounty all around them, they held true to their beliefs and either starved or moved on. Many preferred to starve and let their families starve rather than change beliefs — and we are not even talking great theological beliefs here, merely cultural assumptions.

Meanwhile, the Inuit people (while they might have fared poorly if they would have had to try to survive in the middle of a Swedish city) had long since adapted to the resources at hand and were able to hold on through hard times. Both groups were humans. Both groups had virtually identical physical needs for survival. But one group believed that the resources around them were *not* resources. That group perished.

Anyway, returning to space, if it is true that current technology is at least minimally up to the job of allowing viable first generation space settlements (and I am convinced that it is), then the state of technology at present, is *NOT* a roadblock but merely an expensive and clumsy tool on the hardware store shelf — so to speak. Let me also note that history clearly shows that technology advances quickly to meet the needs of humans when those humans are both presented with serious challenges *and* are *determined* to search for solutions.

Financial Resources

Yet, if an inadequacy of technology is not the answer to the question of why we are not already settling space, then what is? Many among us would answer that finances are where the roadblocks lie. There is a lot of truth in that view. Yet, as with physical reality, I believe that our intellectual disposition (i.e., beliefs, fears, assumption, etc.) is where the real roadblocks are to be found.

The Lesson

We are only at the earliest stages of the dawning of understanding that our past views about what is possible and what is impossible, first, may not be accurate and, second, are the source of much of our inability to overcome the obstacles holding us back from the realization our goals. Kudos to those who have worked hard to find better paradigms and more effective methods. Let's all involve ourselves in this search. **<RRR>**

Richard's homepage:

http://richardpatricia.homestead.com

♂ Mars Society Updates ♂

Euro-Mars Project Underway

From www.marssociety.org

Work has commenced across Europe on working to establish the next in the Mars Analogue Research Station (MARS) units. The United Kingdom, France, The Netherlands and Spain are all working to define possible locations for the Euro-MARS, with sites in Norway, Iceland and Spain being considered. In addition, the multi-nation team working on the project have already started efforts to raise funds for the project ($15,000 already raised), with further sponsors currently being contacted. The team was scheduled to meet in Rotterdam on November 24th 2001 to move the project forward.

Current plans for the Euro-MARS project call for a location for the hab unit to be agreed upon and set early in 2002, with fundraising efforts and the development of the science mission for the unit continuing through 2002. The unit itself is expected to go on-line in late 2002 or early 2003.

NEW MARS is back, bigger, better!

New Mars, the official magazine for the Mars Society, is now back online. Featuring articles, fiction and interviews, *New Mars* has undergone an extensive redesign and visitors will now be able to read and comment on articles with even greater ease. In addition, the website forums have reopened for discussion about all topics Mars and space related.

http://www.newmars.com/

- News & Commentary about all things Mars
- Articles
- Fiction
- Inteviews
- Editorials
- Gallery
- Forums
- Links to Mars Orgnaizations & web sites

● **About the New Mars Galery:** Long before science imagined the landscapes of Mars, art imagined them. The New Mars gallery will celebrate artists past and present who have helped take us to the Red Planet, both as we imagined it and as we believe we know it. **Current Exhibitions:** Michael Carroll and Marilynn Flynn.

● **22 Discussion Forums:** On the Magazine and its articles; on the Exploration and the Development of Mars; on Mars Society projects and policies, etc.

● **Fiction:** This part of *New Mars* is reserved for Mars related fiction by Society Members, a great way for members to develop and share ideas and concepts, hopes, dreams, and fears.

● **Interviews:** Currently, Kim Stanley Robinson *New Mars* is available online for anyone.

ISDC 2002

"Settling the Solar System"

Denver - Tech Center Marriott Hotel

May 23-27, 2002

National Space Society's 21st Annual International Space Development Conf.

AREA ATTRACTIONS

Denver Area

Hotel shuttles are available to transport you to the many different Denver shopping districts and malls, with more than 150 shops, galleries, and fine restaurants concentrated in one place.

- Denver - Colorado's historic Capital
- Denver Museum of Natural History and Science
- Ocean's Journey
- Rocky Mountain National Park
- Worlds Highest Paved Highway - Trail Ridge Road
- Six Flags Elitch's Amusement Park

Colorado Springs Area

- Cave of the Winds
- Pike's Peak
- Garden of the Gods
- Air Force Academy
- Cheyenne Mountain Zoo

ART SHOW

One of the largest Space Art shows in the history of NSS conferences. Display panels are 4' x 4' and tables 1.5' x 6'. Space Art will be exhibited during the conference with some pieces available for purchase. Call Bruce Miller (303) 936-4092 or e-mail Bruce.Miller@dot.state.co.us for more info.

ISDC 2002 is also looking for art to use in progress reports and the program book. Good black and white copies prefered. Do not send originals, we will not return any materials. Send all copies to:

ISDC 2002
4465 Kipling St. #200
Wheat Ridge, CO 80033
(303) 403-9080 - FAX (303) 421-4309

CONFERENCE EXHIBITION

The National Space Society will be presenting an Exhibition in conjunction with ISDC 2002. The hotel's exhibit hall is very large and will accommodate virtually any professional exhibit.

Accordingly, we are inviting governmental entities, non-profit organizations and companies from around the world to participate in the Exhibition. We expect exhibition space to sell quickly, and spaces are reserved on a first-come, first-served basis, so be sure and reserve your space as soon as possible.

A 10' x 10' exhibit space will be available for $500. You may rent a maximum of four contiguous spaces.

Mail-in Exhibitor Registration Form

http://www.isdc2002.org/exhibitor.pdf

Make checks payable to: National Space Society and send the completed form and payment to:

National Space Society
ISDC 2002 Registrations
600 Pennsylvania Ave. SE, Suite 201
Washington, DC 20003

HOTEL - Denver Tech Center Marriott

The Marriott's ISDC rate is $85 plus tax per night, single-quadruple occupancy. Luxury and hospitality suites are also available. We are expecting a record attendance so reserve your room as early as possible. To reserve your room call the Marriott Monday-Friday (remember to tell them you are with ISDC 2002 or The National Space Society):

Denver Tech Center Marriott Hotel
(303) 779-1100
1901 University Blvd NE
Greenwood Village, CO
Toll free 1-800-445-8667.

REGISTRATION Rates:

Friday Professional Day (extra $25 fee)
Seniors/Teachers/Students -- Half Price
Children in Tow -- Free
$90 until 05/01/02 $100 at the Door

FORM (printable or pdf)

http://www.isdc2002.org/register.htm
http://www.isdc2002.org/reg.pdf

Make checks payable to: National Space Society - Address elsewhere on this page.

HOSPITALITY SUITE - 2 hour rentals

To make your organization's hospitality event more affordable, we will be renting two-hour blocks in the ISDC 2002 Hospitality Suite.

You / your organization sponsor the Hospitality Suite for two-hours and either provide the food / drinks, or let our Hospitality Suite Coordinator assist you with your catering needs. Call Peggy Allen at (303) 273-9665 for schedule info.

PROGRAMMING

All day Professional Symposium (extra $25 fee):

- Military Space
- Space Medicine
- Space Law
- Space Business .

General Programming will include:

- Space Mining
- Space Solar Power
- Launch Facilities
- Space Construction
- Educator Training
- Launch Technologies
- Development and Settlement of the Moon & Mars
- NSS 101
- Many Roads to Space
- Plenaryfeaturing cutting edge visionaries.

Other events: Art Show, Video Room, SF Authors, Star Gazing, Amateur Rocketry, Model Contest, Space Computer Games, Late Night Entertainment, plus much more.

Planetary Society Year End Report

from Louis J. Friedman, Executive Director

I appreciate the opportunity to communicate with you via e-mail, and hope you appreciate getting this year-end report. There's a lot happening at The Planetary Society, as well as in the broader society in which we all live. I am proud of September/October issue of The Planetary Report, especially its cover evoking the Pale Blue Dot and what it symbolizes about our place in the universe. December 20 is the 5th anniversary of Carl Sagan's death; we miss him.

We are facing a tough time - the economy is in recession, and the mail, which as you know is central to the Society's membership services, is full of problems. Almost all non-profit organizations, except those dealing directly in relief for the disasters of 9-11, are feeling squeezed. We're feeling it too, though we're sure this is not a sign of decreased support for space exploration, but only a temporary set-back due to greater societal factors. In these times, we need the help and support of every member. Please consider giving a gift membership in The Planetary Society this holiday season. You can easily do so on our web site at

https://planetary.org/gift_membership.html

As far as our programs go - this has been a great year for the Society. Here are some highlights:

Pluto: We campaigned hard this year for a Pluto mission, even though NASA officially opposed it when it was cut from the President's budget request last February. Along with colleagues in the science community, Society members were successful in persuading Congress to add money for Pluto in the 2002 budget. But the struggle is not over yet, and we will be watching the President's 2003 budget submission to Congress in late January or early February.

Mars: With our partners at LEGO, we continued our Red Rover Goes to Mars project. The students from our first round of winners made a discovery of their own on Mars- thanks to the cooperation of Malin Space Science Systems, who built and operate the camera on Mars Global Surveyor. The students were allowed to control the MGS camera and found some mysterious boulders in a Martian sand dune. How the boulders were deposited there has yet to be explained.

The Society has long advocated a series of robotic landers and orbiters, leading to a Mars outpost that can prepare the way for humans to explore the Red Planet. We have begun a political and technical initiative called Mars Outposts and will soon make some exciting announcements about our involvement on international Mars missions.

Comets & Asteroids: We have just issued a call for new applications for our Gene Shoemaker NEO Grant program. These grants enable talented amateur astronomers and professionals in developing nations to make significant contributions to the study of near-Earth objects, such as comets and asteroids. Our previous grants have paid valuable dividends in scientific knowledge, and we look forward to seeing what this year's selection can contribute.

SETI: The Society supports a wide range of new initiatives, including the world's first and only dedicated optical SETI observatory. Telescope construction is underway at the Oak Ridge observatory in Harvard, Massachusetts, under the direction of Harvard professor Paul Horowitz. The Society continues as the lead sponsor of the world's largest scientific experiment, SETI@home. Over three million people now participate in this project, hoping to discover the first extraterrestrial signal received on Earth.

Earth: We initiated cooperation with the NASA/SETI Institute Haughton Mars Project in the Canadian Arctic to advance research about Mars outposts and the use of Mars analogs on Earth to learn how to better explore the Red Planet. Expect an announcement early next year about a new Society initiative with this project.

We also participated with NASA in naming the Carl Sagan Center for Study of Life in the Cosmos, a brand new research facility at the Ames Research Center.

Finally, and best of all, we continue our Cosmos 1 project to fly the world's first solar sail. Together with our partner, Cosmos Studios, we are conducting this historic, privately funded project and breaking new ground in space technology. We plan to launch sometime next spring.

For Our Members: We continue to develop new partnerships and add benefits for our members. I'd like to remind you about the opportunity for Planetary Society members to buy Meade telescopes at discount through the Discovery Stores, either in the "bricks and mortar" shops or on the Internet: http://planetary.org/html/member/DiscoveryStore.html The offer will only last for three more months, so take advantage of it soon.

We've also made arrangements for members to receive discounts at many planetariums across the US, and we hope to extend this program around the world. A list of participating institutions is at: http://planetary.org/html/member/planetariums.html

If you would like to learn more about everything I've discussed, -- or give that gift membership -- please visit us at our ever-expanding web site: http://planetary.org

Thank you for your support over the past year, and I look forward to working with you as we strive toward our goals of exploring the solar system and searching for extraterrestrial life.

Louis Friedman Executive Director

Mars Desert Research Station Construction Photos

Some 35 photos online at:

http://chapters.MarsSociety.org/swhab/files/GreenHab/build_photos/

This page is simply a directory/index of the photo images by name. Simply click on a photo name to see the picture.

The photos show how this second Mars outpost analog facility was designed and assembled on site.

In addition to the photos of the various construction phases, there is a set of photos that pan the terrain. The area is rather hilly, and quite devoid of vegetation, with a barrenness that mimicks Mars. One shot in particular, sdc_terrain_3.jpg really transports one's imagination to Mars as we might imagine it. This clearly is a mood-setting location.

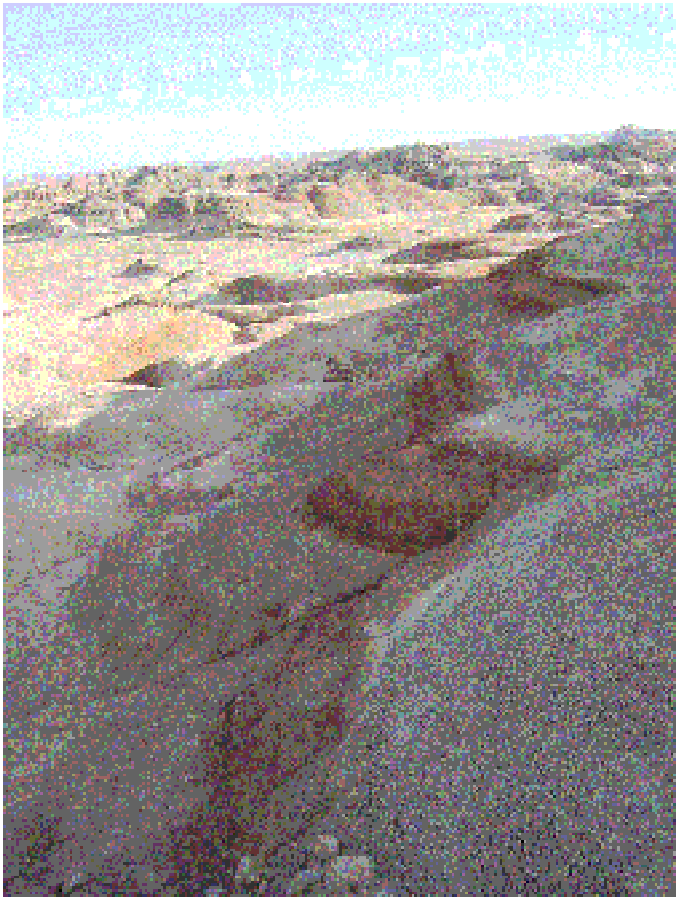


Photo sdc_hab_5.jpg shows the terrain in the immediate vicinity of the analog outpost. We gave details on the exact location in south central Utah in our last newsletter, MMM #151, page 15, 2nd column. The nearest town (5 miles to the south) is Hanksville, population 362.

MDRS is currently in "shakedown" phase, and it is hoped that the first field season will begin some time in January, with year-around operations. Visits by students and other tourists will be accommodated in summer time. **<MS>**

The Lunar Reclamation Society, Inc.

PO Box 2102
Milwaukee
WI 53201

www.lunar-reclamation.org

Ad Astra per Ardua Nostra
To the Stars through our own hard work!

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(* LRS Board Members)

LRS NEWS

• **15 people make 15th Anniversary Holiday Party one of best ever:** Four members of the Wisconsin Mars Society (plus two of our members in common) swelled our ranks. One of them had run into Mary Dixon (widow of Bob Bramscherr who died in August 2001) and as a result she and son Carl came too! We had brought along our portable Earthrise Moon Mural to use as a photo op background - LRS VP and Media Chair Bob Bialecki had arranged for a photographer from ***Milwaukee Lifestyles*** magazine to be present. The pot-luck fare was great and we all enjoyed the film "The Dish." about the role of the Radio Telescope in Australia during Apollo 11.

LRS JAN / FEB Events

Saturday, JAN 12th & FEB 9th, 1-4 pm

LRS Chapter Meeting, Mayfair Mall, Garden Suites **Rm G11** (lower level, NE part of Mall) near the ground-level entrance below General Cinemas.

Wisconsin Mars Society c/o Matthew Giovanelli
7133 West Wells Street, Milwaukee, WI 53213
414-774-8952 - chooy@execpc.com
http://chapters.marssociety.org/usa/wi/
WMS usually meets at address above on 3rd Sat. 1pm
contact Matt by phone or email address above

U.S. CHAPTERS

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MMM
8 Chapters Strong

Space Chapters HUB Website:

http://www.nss.ac/hub/

WISCONSIN

Sheboygan Space Society

728 Center St., Kiel WI 54042-1034

c/o Will Foerster 920-894-2376 (h) <willf@tcei.com>
SSS Sec. Harald Schenk <hschenk@excel.net>

>>> DUES: "SSS" c/o B. P. Knier
22608 County Line Rd, Elkhart Lake WI 53020

NEW >>> http://www.tcei.com/sss

☞ We meet the 3rd Tuesday of the month at **7-9pm**

JAN 15th Foerster Academy of Dance, **Sheboygan**

FEB 19th MEETING at the Stoelting House in **Kiel**

MINNESOTA

Minnesota Space Frontier Society

c/o Dave Buth, 3331 Cedar Ave. S. #2
Minneapolis, MN 55407

612-721-4772 (Dave Buth) 612-375-1539 (Jeff Root)
Email: mnsfs@freemars.org

www.FreeMars.org/l5/index.html

STS 108 Displays: MN SFS has had STS 108 displays at Radio City in Moundsville and at the Minneapolis Planetarium since late November.

OHIO

Cuyahoga Valley Space Society

3433 North Ave. Parma, OH 44134-1252
c/o George F. Cooper III, Phone 216-749-0017
E-Mail: geocooper3@aol.com [new]

☞ Monthly Meetings, the 4th Thursday each month

7-9:15 pm, Parma Regional Library

NEXT DATE: **JAN 24, FEB 28**

CALIFORNIA

OASIS

OASIS: Organization for the Advancement of Space Industrialization and Settlement

P.O. Box 1231, Redondo Beach, CA 90278

Events Hotline/Answering Machine: (310) 364-2290
Odyssey Ed: Craig Ward - cew@acm.org
E-mail: oasis-leaders@netcom.com

http://chapters.nss.org/oasis

Odyssey Newsletter Online
http://www.geocities.com/CapeCanaveral/Lab/4005/articles.html

> Regular Meeting 3 pm 3rd Sat. each month

Information: OASIS Hotline, 310/364-2290; website.

JAN 19th -- Business Meeting at location TBD
FEB 16th -- Business Meeting at location TBD
MAR 16th -- Business Meeting at location TBD

- **Recurring Events**
  - **The Griffith Observatory** will close Jan. 2002 to undergo renovations and upgrades. The Observatory is expected to reopen in 2003.]
  - **Fridays, 7 pm** "Night Sky Show." -- **8 pm** Guest lectures. Santa Monica College John Drescher Planetarium, 2nd Floor Technology Building, 1900 Pico Blvd. $4 per show or $7 for both. Info: 310/452-9223 www.smc.edu/events/weeklyeven.
  - **Fridays** -- "Mike Hodel's Hour 25" webcast. The world of science fact and fiction with interviews, news, radio dramas, artists, writers, stories, reviews. Info: www.hour25online.com/.

OREGON

Oregon L5 Society, Inc.

P.O. Box 86, Oregon City, OR 97045
voice mail / FAX (503) 655-6189

http://www.OregonL5.org/

Allen G. Taylor <allen.taylor@ieee.org>
Bryce Walden <BWalden@aol.com>
(LBRT - Oregon Moonbase) moonbase@home.com

☞ Meetings **3rd Sat.** each month at **2 p.m.**
Bourne Plaza, 1441 SE 122nd, Portland, **downstairs** NEXT MEETINGS: **JAN 19, FEB 16**

PENNSYLVANIA

Philadelphia Area Space Alliance

PO Box 1715, Philadelphia, PA 19105

c/o Earl Bennett, EarlBennett@erols.com
215/633-0878 (H), 610/640-2345(W)

NEW URL http://pasa01.tripod.com

Note : PASA is now on the tripod.com system

• **PASA regular** business luncheon/formal meeting from **1-3 pm**, the **3rd Saturday** of every month (*except 2nd Saturday this February and March*), at the **Liberty One** food court on the second level, 16th and S. Market. Go toward the windows on the 17th street side and go *left*. Look for table sign. Parking at Liberty One on 17th St.

• **Scheduled PASA activities:** Call Earl Bennett or Mitch Gordon 215-625-0670 to verify all meetings

NEXT MEETINGS: **JAN 19th, FEB 9th, MAR 9th**
(*NOTE: 2nd Saturday in Feb & March*)

by PASA Secretary Jay Haines <hainesjb@netaxs.com>

• **December 15th Meeting Report:**

Elections results:

- President/Technology Director - *Earl Bennett*
- VP Public Relations and NSS and World Future Society representative - *Mitch Gordon*
- Secretary/Treasurer and SSI representative - *Jay Haines*
- VP Membership and Planetary Society representative - *Dottie Kurtz*
- Science Fiction Director - *Hank Smith*
- Exhibits Director and Mars Society representative - *Gary Fisher*
- Education Director - open.

Congratulations to all. Anyone wanting to be the PASA Education Director, contact Earl.

Michelle Baker gave her final National Space Society (NSS) report, as she will be taking some time off as a PASA officer. Mitch Gordon discussed the Derrick Pitts astronomy talks on WHYY-FM 90.9 every Mon. at 06:30 and 08:30. Hank Smith discussed changes at the Phila. Science Fiction Society; Philcon 2002 will probably be held at the Phila. Marriott in Dec., instead of the Adam's Mark in Nov.

Jay Haines discussed the Space Studies Institute's latest report, including their proposed 2002 research agenda, their progress report on closed ecology research, and the summary of the May 2001 Space Manufacturing Conference. Earl Bennett discussed plans to exhibit at the Trenton Super Science Weekend, to be held Jan. 5-6; and the GW Carver Science Fair. Anyone wanting to be the PASA contact for the fair, call Earl. Gary Fisher showed pictures of his trip to Hanksville UT to erect the Mars Desert Research Station. Pictures available at:

http://chapters.marssociety.org/swhab/files/GreenHab/build_photos/.

Earl also discussed a Jan.-Feb. ^Technology Review^ article on an amateur satellite picking up a GPS signal from 50K kilometers away, and plans to listen for GPS signals from the vicinity of the Moon; and a Dec. ^Design News^ article on plans for a Boeing stratocruiser that will cut 1 hour off a transcontinental flight by flying at the speed of sound.

ILLINOIS

Chicago Space Frontier L5

610 West 47th Place, Chicago, IL 60609

Larry Ahearn: 773/373-0349

Call Larry for MEETING INFORMATION

Wishing all our readers a Safe and Productive 2002

NAME _____.

STREET _____.

CITY/ST/ZIP _____.

PHONE #S _____.

○ $35 **NATIONAL SPACE SOC.** dues w. ***Ad Astra***

○ $20 NSS dues if under 22 or over 64. *Must state age* ___ NSS, 600 Pennsylvania Ave SE #201, Washington DC 20003 (Make payable to local chapter *for 1st year* ***free*** *local dues*) (Offer not honored by Oregon L5 Society)

○ $35 **MOON Society** dues with **MMM**

○ $25 **Moon Society** dues IF already getting MMM Moon Soc. Membership, PO Box 940825, Plano, TX 75094

Member Dues -- MMM/MMR Subscriptions:

Send proper amount to address listed in chapter news sections

=>*for those outside participating chapter areas* <=

○ $15 **Individual Subscriptions to MMM/MMR:**

Outside North America ○ $45 Surface Mail -- Make payable to "LRS", P.O. Box 2102, Milwaukee WI 53201

CUYAHOGA VALLEY SPACE SOCIETY

○ $10 presently; Raise to $15 under consideration

CHICAGO SPACE FRONTIER L5

○ $15 annual dues

LUNAR RECLAMATION SOCIETY, INC.

○ $15 regular, ○ $20 family, ○ $12 student / senior cit.

MINNESOTA SPACE FRONTIER SOCIETY

○ $20 Regular Dues

OREGON L5 SOCIETY

NOTE DUES RAISE: ○ $23 for all members

O.A.S.I.S. L5

○ $18 regular dues

PHILADELPHIA **A**REA **S**PACE **A**LLIANCE **- PASA**

○ Annual dues for all with MMM $16, due in March or $4 times each quarter before the next March

SHEBOYGAN SPACE SOCIETY

○ $15 regular, ○ $10 student, ○ $1 / extra family memb "SSS" c/o B. P. Knier, 22608 County Line Rd, Elkhart Lake WI 53020

Moon Miners' REVIEW # 30

Lunar **R**eclamation **S**ociety Inc.
PO Box 2102, Milwaukee WI 53201-2102.

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